



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
ATTY. DOCKET NO. 50422-6

IPR

In re Patent Application of Steve Hill

Serial No. 10/761,408 (Unofficial)

Group Art Unit:

Filed: January 22, 2004

Examiner:

For: LIGHT EMITTING DIODES AND PLANAR OPTICAL LASERS USING IV  
SEMICONDUCTOR NANOCRYSTALS

**INFORMATION DISCLOSURE STATEMENT**

This Information Disclosure Statement is being filed in the manner prescribed by 37 CFR 1.97(b)

- (d) to satisfy the duty under 37 CFR 1.56 to disclose to the Office information, known to individuals associated with the filing and prosecution of the subject application, which is material to the examination of the application.

In accordance with 37 CFR 1.97(g) and (h), this statement is not to be construed as a representation that a search has been made or an admission that the information cited herein is, or is considered to be, material to patentability as defined in 37 CFR 1.56(b).

This information disclosure statement is being filed within three months of the filing date of a national application, within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; or before the mailing date of a first official action on the merits and therefore applicant respectfully requests consideration under 37 CFR 1.97(b).

In compliance with 37 CFR 1.98(a)(1), a list of all patents, publications or other information submitted for consideration by the Office is hereby provided by way of the attached Form PTO 1449.

In compliance with 37 CFR 1.98(a)(2), also enclosed is a legible copy of:

- i) each United States and foreign patent;
- ii) each publication or that portion which caused it to be listed; and
- iii) all other information or that portion which caused it to be listed, excluding any copies of a United States patent application.

It is respectfully requested that the information be expressly considered by the Examiner and that the references be made of record and appear among the "References Cited" on any patent to issue therefrom.

The Patent Office is hereby authorized to charge any deficiency, or credit any overpayment in fees to Deposit Account Number 19-2550.

Respectfully submitted,

STEVEN E. HILL

Ralph A. Dowell  
Reg. No. 26,868

Dated: April 21, 2004

Encls.: Form PTO-1449  
All references listed on Form PTO-1449  
Acknowledgement Card

LIST OF PATENTS AND PUBLICATIONS  
FOR APPLICANT'S INFORMATION  
DISCLOSURE STATEMENT  
(Use several sheets if necessary)



Applicant Steven E. Hill

Filing Date January 22, 2004

Group

## REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAM. INIT.		DOCUMENT NUMBER							DATE	NAME	CLASS	SUB CLASS	FIL.DATE IF APPROPRIATE
	AA	5	4	3	4	8	7	8	Jul 18, 1995	Lawandy	372	43	
	AB	6	2	9	4	4	0	1	Sept 25, 2001	Jacobson et al.	438	99	
	AC	0	0	1	7	6	5	7	Feb 14, 2002	Coffa et al.	257	200	
	AD	0	0	7	0	1	2	1	Jun 13, 2002	Nayfch et al.	205	549	
	AE	0	0	7	4	5	6	5	Jun 20, 2002	Flagan et al.	257	200	
	AF	0	1	6	3	0	0	3	Nov 7, 2002	Dal Negro et al.	257	79	

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER							DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION	
													YES	NO
	AG	2	0	6	1	8	1	5	28.01.2002	WO	H01L	21/20		

## OTHER ART (including Author, Title, Date, Pertinent Pages, Etc.)

AH		A. Nakajima, et al.; MICROSTRUCTURE AND OPTICAL ABSORPTION PROPERTIES OS Si NANOCRYSTALS FABRICATED WITH LOW-PRESSURE CHEMICAL-VAPOR DEPOSITION; J. Appl. Phys., Vol. 80, No. 7, 1 October 1996, pp. 4006-4011.
AI		Jeong Sook Ha, et al.; Er <sup>3+</sup> PHOTOLUMINESCENCE FROM Er-DOPED AMORPHOUS SiO <sub>x</sub> FILMS PREPARED BY PULSED LASER DEPOSITION AT ROOM TEMPERATURE: THE EFFECTS OF OXYGEN CONCENTRATION; Applied Physics Letters, Vol. 82, No. 20, 19 May 2003, pp. 3436-3438.
AJ		Jung H. Shin, et al.; EFFECT OF HYDROGENATION ON ROOM-TEMPERATURE 1.54 μm Er <sup>3+</sup> PHOTOLUMINESCENT PROPERTIES OF ERBIUM-DOPED SILICON-RICH SILICON OXIDE; Applied Physics Letters, Vol. 73, No. 25, 21 December 1998, pp. 3647-3649.
AK		T.G. Kim, et al.; CONTROLLING THE FORMATION OF LUMINESCENT Si NANOCRYSTALS IN PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITED SILICON-RICH SILICON OXIDE THROUGH ION IRRADIATION; Journal of Applied Physics, Vol. 91, No. 5, 1 March 2002, pp. 3236-3242.
AL		M. Li, et al.; ELLIPSOMETRY INVESTIGATION OF NUCLEATION AND GROWTH OF ELECTRON CYCLOTRON RESONANCE PLASMA DEPOSITED SILICON FILMS; J. Vac. Sci. Technol. A 11(4) Jul/Aug 1993, pp. 1686-1691.
AM		H.S. Bae, et al.; ELECTROLUMINESCENCE MECHANISM IN SiO <sub>x</sub> LAYERS CONTAINING RADIATIVE CENTERS; Journal of Applied Physics, Vol. 91, No. 7, 1 April 2002, pp. 4078-4081.
AN		Minoru Fujii, et al.; 1.54 μm PHOTOLUMINESCENCE OF Er <sup>3+</sup> DOPED INTO SiO <sub>2</sub> FILMS CONTAINING Si NANOCRYSTALS: EVIDENCE FOR ENERGY TRANSFER FROM Si NANOCRYSTALS TO Er <sup>3+</sup> ; Appl. Phys. Lett. 71 (9), September 1997, pp. 1198-1200.
AO		Giorgia Franzò, et al.; ENHANCED RARE EARTH LUMINESCENCE IN SILICON NANOCRYSTALS; Materials Science and Engineering B69-70, 2000, pp. 335-339.

EXAMINER	DATE CONSIDERED

EXAMINER:

Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

LIST OF PATENTS AND PUBLICATIONS  
FOR APPLICANT'S INFORMATION  
DISCLOSURE STATEMENT  
(Use several sheets if necessary)



Atty. Docket No. 50422-6

Serial No. 10/761,408

Applicant Steven E. Hill

Filing Date January 22, 2004

Group

## OTHER ART (including Author, Title, Date, Pertinent Pages, Etc.)

	AP		Giorgia Franzò, et al.; Er <sup>3+</sup> IONS-Si NANOCRYSTALS INTERACTIONS AND THEIR EFFECTS ON THE LUMINESCENCE PROPERTIES; Applied Physics Letters, Vol. 76, No. 16, 17 April 2000, pp. 2167-2169.
	AQ		Se-Young Seo, and Jung H. Shin; EXCITON-ERBIUM COUPLING AND THE EXCITATION DYNAMICS OF Er <sup>3+</sup> IN ERBIUM-DOPED SILICON-RICH SILICON OXIDE; Applied Physics Letters, Vol. 78, No. 18, 30 April 2001, pp. 2709-2711.
	AR		Jung H. Shin, et al.; PHOTOLUMINESCENCE EXCITATION SPECTROSCOPY OF ERBIUM-DOPED SILICON-RICH SILICON OXIDE; Applied Physics Letters, Vol. 76, No. 15, 10 April 2000, pp. 1999-2001.
	AS		F. Iacona, et al.; ELECTROLUMINESCENCE AT 1.54 μm IN Er-DOPED Si NANOCLUSTER-BASED DEVICES; Applied Physics Letters, Vol. 81, No. 17, 21 October 2002, pp. 3242-3244.
	AT		Minoru Fujii, et al.; PHOTOLUMINESCENCE FROM SiO <sub>2</sub> FILMS CONTAINING Si NANOCRYSTALS AND Er: EFFECTS OF NANOCRYSTALLINE SIZE ON THE PHOTOLUMINESCENCE EFFICIENCY OF Er <sup>3+</sup> ; Journal of Applied Physics, Vol. 84, No. 8, 15 October 1998, pp. 4525-4531.
	AU		A.J. Kenyon, et al.; LUMINESCENCE FROM ERBIUM-DOPED SILICON NANOCRYSTALS IN SILICA: EXCITATION MECHANISMS; Journal of Applied Physics, Vol. 91, No. 1, 1 January 2002, pp. 367-374.
	AV		J. De la Torre, et al.; OPTICAL AND ELECTRICAL TRANSPORT MECHANISMS IN Si-NANOCRYSTAL-BASED LEDs; Elsevier Science B.V., Physica E, 2002, pp. 1-3.
	AW		Jung H. Shin, et al.; COMPOSITION DEPENDENCE OF ROOM TEMPERATURE 1.54 μm Er <sup>3+</sup> LUMINESCENCE FROM ERBIUM-DOPED SILICON: OXYGEN THIN FILMS DEPOSITED BY ELECTRON CYCLOTRON RESONANCE PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION; Applied Physics Letters, Vol. 72, No. 9, 2 March 1998, pp. 1092-1094.
	AX		P.G. Kik, et al.; STRONG EXCITON-ERBIUM COUPLING IN Si NANOCRYSTAL-DOPED SiO <sub>2</sub> ; Applied Physics Letters, Vol. 76, No. 17, 24 April 2000, pp. 2325-2327.
	AY		G. Franzò, et al.; ELECTROLUMINESCENCE OF SILICON NANOCRYSTALS IN MOS STRUCTURES; Appl. Phys. A, Materials Science & Processing, 74, (2002), pp. 1-5.
	AZ		A. Irrera, et al.; EXCITATION AND DE-EXCITATION PROPERTIES OF SILICON QUANTRUM DOTS UNDER ELECTRICAL PUMPING; Applied Physics Letters, Vol. 81, No. 10, 2 September 2002, pp. 1866-1868.
	aa		P.S. Andry, et al.; GROWTH OF Er-DOPED SILICON USING METALORGANICS BY PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITION; J. Appl. Phys. 80 (1), 1 July 1996, pp. 551-558.
	ab		Kei Watanabe, et al.; RESONANT EXCITATION OF Er <sup>3+</sup> BY THE ENERGY TRANSFER FROM Si NANOCRYSTALS; Journal of Applied Physics, Vol. 90, No. 9, 1 November 2001, pp. 4761-4767.
	ac		J. De la Torre, et al.; OPTICAL PROPERTIES OF SILICON NANOCRYSTAL LEDs; Elsevier Science B.V., Physica E, 2002, pp. 326-330.

EXAMINER

DATE CONSIDERED

EXAMINER:

Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.